CBSE Class 9 Mathemaics
Important Questions
Chapter 15
Probability

1 Marks Questions

1. Out of 35 students Participating in a debate 10 are girls. The Probability that winner is a boy is :

(a) 1 (b) $\frac{2}{7}$ (c) $\frac{3}{7}$ (d) $\frac{5}{7}$

Ans. (d) $\frac{5}{7}$

There are 5 balls, each of the colours white, blue, green, red and yellow in a bag. If 1 balls is drawn from the bag, then the Probability that the ball drawn is red is

(a) $\frac{4}{5}$ (b) $\frac{1}{4}$ (c) $\frac{1}{5}$ (d) $\frac{1}{20}$

Ans. c) $\frac{1}{5}$

3.If P(e)= 0.25 what is the value of P(not E)

(a) 0.5 (b) 1 (c) 0 (d) 0.75

Ans. (d) 0.75

4.Sum of the probabilities of all events of a trial is

(a) less than 1 (b) greater than 1 (c) lies between 0 and 1 (d) 1

Ans. d) 1

5. A four digit number is to be formed by using the digits 2, 4, 7, 8. The probability that the number will start with 7 is

(a) $\frac{3}{4}$ (b) $\frac{1}{4}$ (c) $\frac{1}{3}$ (d) $\frac{1}{7}$

Ans. (b) $\frac{1}{4}$

6. The probability of an event of a trial :

(a) is 1 (b) lies between 0 and 1 (both inclusive)

(c) is 0 (d) is greater than 1

Ans. (b) lies between 0 and 1 (both inclusive)

7. A die is thrown once, the probability of getting a prime number on the die is :

(a) $\frac{1}{6}$ (b) $\frac{1}{3}$ (c) $\frac{1}{2}$ (d) $\frac{2}{3}$

Ans. (c) $\frac{1}{2}$

8. If two coins are tossed, then the probability of getting no tail is :

(a) $-\frac{1}{4}$ (b) $\frac{1}{4}$ (c) $\frac{1}{5}$ (d) $\frac{3}{4}$

Ans. (b) $\frac{1}{4}$

9. If is dice is thrown once what is the probability of getting an even prime number.

(a) $\frac{1}{6}$ (b) $\frac{1}{2}$ (c) $\frac{2}{3}$ (d) 1

Ans. $\frac{1}{6}$

10. A card is drawn from a pack of 52 cards what is the probability of getting an non ace card.

(a) $\frac{1}{13}$ (b) $\frac{12}{13}$ (c) $\frac{1}{4}$ (d) none of these

Ans. $\frac{12}{13}$

11. The minimum value of probability is

(b) $\frac{1}{2}$ (c) 0 (d) none of these

Ans. 0

12. Performing an experiment once is called

(a) Trial (b) Event (c) Probability (d) none of these

Ans. Trial

13. What is the probability of a number greater than 6 for a single throw of a die?

(a) 0 (b) 1 (c) $\frac{1}{2}$ (d) none of these

Ans. 0

14. If $P\left(E\right) = \frac{3}{4}$ what is value of $P\left(\overline{E}\right)$.

(a) $\frac{3}{4}$ (b) $\frac{1}{4}$ (c) 1 (d) none of these

Ans. $\frac{1}{4}$

15. A card is drawn from a pack of 52 playing cards. What is the probability of getting an king of black colour

(a) $\frac{1}{26}$ (b) $\frac{4}{52}$ (c) $\frac{1}{4}$ (d) none of these

Ans. $\frac{1}{26}$

16. A coin is tossed 2 times what is the probability of getting at most 2 heads.

(a) $\frac{3}{4}$ (b) $\frac{1}{2}$ (c) $\frac{1}{4}$ (d) none of these

Ans. None of these

2 Marks Questions

1. A teacher analyses the performance of two sections of students in a mathematics test of 100 marks given in the following table:

	No. of students
0 – 20	7
20 – 30	10
30 – 40	10
40 – 50	20
50 – 60	20
60 – 70	15
70 and above	8
total	90

1. Find the probability that a student obtained less than 20% in the mathematics test.

2. Find the probability that a student obtained 60 or above.

Ans. (i)No. of students obtaining marks less than 20 out of 100, i.e. 20% = 7

Total students in the class = 90

∴ P (A student obtained less than 20%) = $\dfrac{7}{90}$

∴ P (A student obtained marks 60 or above) = $\dfrac{23}{90}$

2. To know the opinion of the students about the subject statistics, a survey of 200 students was conducted. The data is recorded in the following table:

Opinion	No. of students
likes	135
dislikes	65

Find the probability that a student chosen at random:

(i) likes statistics (ii) dislikes it.

Ans. Total no. of students on which the survey about the subject of statistics was conducted = 200

i) No. of students who like statistics = 135

∴ P (a student likes statistics) = $\frac{135}{200} = \frac{27}{40}$

ii) No. of students who do not like statistics = 65

∴ P (a student does not like statistics) = $\frac{65}{200} = \frac{13}{40}$

3. Refer Q.2, Exercise 14.2. What is the empirical probability than an engineer lives:

1. **less than 7 km from her place of work?**
2. **more than or equal to 7 km from her place of work?**
3. **within $\frac{1}{2}$ km from her place of work?**

Ans. Total number of engineers = 40

i) No. of engineers living less than 7 km from her place of work = 9

∴ P (Engineer living less than 7 km from her place of work) = $\frac{9}{40}$

ii) No. of engineers living more than or equal to 7 km from her place of work =

∴ P (Engineer living more than or equal to 7 km from her place of work) = $\frac{21}{40}$

(iii) No. of engineers living within km from her place of work = 0

∴ P (Engineer living within $\frac{1}{2}$ km from her place of work) = $\frac{0}{40}$ = 0

4. Activity: Note the frequency of two wheelers, three wheelers and four wheelers going past during a time interval, in front of your school gate. Find the probability that any one vehicle out of the total vehicles you have observed is a two wheeler.

Ans. Let you noted the frequency of types of wheelers after school time (i.e. 3 pm to 3.30 pm) for half an hour.

Let the following table shows the frequency of wheelers.

Types of wheelers	Frequency of wheelers
Two wheelers	125
Three wheelers	45
Four Wheelers	30

Probability that a two wheelers passes after this interval =

5. Activity: Ask all the students in your class room to write a 3-digit number. Choose any student from the room at random. What is the probability that the number written by him is divisible by 3, if the sum of its digits is divisible by 3.

Ans. Let number of students in your class is 24.

Let 3-digit number written by each of them is as follows:

837, 172, 643, 371, 124, 512, 432, 948, 311, 252, 999, 557, 784, 928, 867, 798, 665, 245, 107, 463, 267, 523, 944, 314

Numbers divisible by 3 are = 837, 432, 948, 252, 999, 867, 798 and 267

Number of 3-digit numbers divisible by 3 = 8

∴ P (3-digit numbers divisible by 3) = $\frac{8}{24} = \frac{1}{3}$

6. Eleven bags of wheat flour, each marked 5 kg, actually contained the following weights of four (in kg):4.97, 5.05, 5.08, 5.03, 5.00, 5.06, 5.08, 4.98, 5.04, 5.07, 5.00

Find the probability that any of these bags chosen at random contains more than 5 kg of flour.

Ans. Number of bags containing more than 5 kg of wheat flour = 7

Total number of wheat flour bags = 11

∴ P (a bag containing more than 5 kg of wheat flour) = $\frac{7}{11}$

7. In Q.5, Exercise 14.2, you were asked to prepare a frequency distribution table, regarding the concentration of sulphur dioxide in the air in parts per million of a certain city for 30 days. Using this table, find the probability of the concentration of sulphur dioxide in the interval 0.12 – 0.16 on any of these days.

Ans. From the frequency distribution table we observe that:

No. of days during which the concentration of sulphur dioxide lies in interval 0.12 – 0.16 = 2

Total no. of days during which concentration of sulphur dioxide recorded = 30

∴ P (day when concentration of sulphur dioxide (in ppm) lies in 0.12 – 0.16) = $\frac{2}{30} = \frac{1}{15}$

8. In Q.1, Exercise 14.1 you were asked to prepare a frequency distribution table regarding the blood groups of 30 students of a class. Use this table to determine the probability that a student of this class selected at random has blood group AB.

Ans. From the frequency distribution table we observe that:

Number of students having blood group AB = 3

Total number of students whose blood group were recorded = 30

∴ P (a student having blood group AB) = $\frac{3}{30} = \frac{1}{10}$

9. A die is thrown 1000 times with the frequencies for the outcomes 1, 2, 3, 4, 5 and 6 as given in the following table:

Outcome	1	2	3	4	5	6

Frequency	179	150	157	149	175	190

Find the probability of getting each outcome.

Ans. (i) No. of outcome getting no. 1 = 179

$$P(1) = \frac{179}{1000} = 0.179$$

(ii) Probability of outcome 2

$$P(2) = \frac{150}{1000} = 0.15$$

(iii) Probability of outcome 3

$$P(3) = \frac{157}{1000} = 0.157$$

(iv) Probability of outcome 4

$$P(4) = \frac{149}{1000} = 0.149$$

(v) Probability of outcome 5

$$P(5) = \frac{175}{1000} = 0.175$$

(vi) Probability of outcome 6

$$P(6) = \frac{190}{1000} = 0.19$$

10. Two coins are tossed 729 times and the out comes are:

No tail: 189, One tail: 297, Two tails: 243

Find the Probability of the occurrence of each of these events.

Ans. No. of total trials = 729

E1, E2 and E3 are events getting no tail, one tail and two tails, then

$$P(E_1) = \frac{189}{729} = \frac{7}{27}$$
$$P(E_2) = \frac{297}{729} = \frac{11}{27}$$
$$P(E_3) = \frac{243}{729} = \frac{1}{3}$$

11. A bag contains 15 cards bearing numbers 1, 2, 3, 4, ... , 14, 15. A card is drawn from the bag. Find the Probability that it bears :

(i) a Prime number (ii) A number divisible by 2

Ans. Total number of cards = 15

No. of total trials = 15

(i) Among 1, 2, 3, 4,......., 14,15, prime number are 2, 3, 5, 7, 11, 13

Number of favourable outcomes = 6

P (Prime number) = $\frac{6}{15} = \frac{2}{5}$

(ii) Among 1, 2, 3, 4, ..., 14, 15

No. divisible by 2 are 2, 4, 6, 8, 10, 12, 14

$\therefore$ Number of outcomes = 7

P (no. divisible by 2) = $\frac{7}{15}$

12. A coin is tossed 400 times and outcomes are

Tail: 230 Head:170

Ans. (i) Total outcomes = 400

Head = 170

$$P(H) = \frac{170}{400} = \frac{17}{40}$$

(ii) Tail = 230

$$P(T) = \frac{230}{400} = \frac{23}{40}$$

13. A survey of 200 students was conducted to check the opinion of students about the topic geometry. It was found that 175 students do not like geometry. Find the probability of the students who like geometry.

Ans. Total no. of Students = 200

The no. of students do not like geometry = 175

The no. of students who like geometry = 200-175=25

∴P (no. of students who like geometry) = $\frac{25}{200}$

$$= \frac{5}{40} = \frac{1}{8}$$

14. Three coins are tossed simultaneously 200 times with the following frequencies of different outcomes.

Outcomes	3 heads	2 heads	1 heads	No head
Frequency	23	72	77	28

Compute the probability of 2 heads coming up.

Ans. Total number of tosses = 200

Number of outcomes of 2 heads = 72

P (2 heads) $= \frac{72}{200} = \frac{9}{25}$

15. The heights of 70 students are given in the following table.

Heights (in cm)	150	160	158	155	164	168
No. of students	10	14	8	15	7	16

Find the probability that a student has height.

(i) 169 cm (ii) Less than 150 cm

Ans. (i) Total no. of students = 70

∴No. of total trial =70

The no. of students has height 169 cm = 0

P (a student has a height 169 cm) = $\frac{0}{70} = 0$

(ii) No. of students has height less than 150 cm = 0

P (a student has a height less than 150 cm) = $\frac{0}{70} = 0$

16. A bag contains 20 cards numbered from 1 to 20 one card is drawn from the bag. Find the probability that it bears a prime number.

Ans. Total no. of cards = 20

No. marks on the cards are 1, 2, 3, 4, 5, 6, ... , 20

Prime numbers are {2, 3, 5, 7, 11, 13, 17, 19}

Total prime numbers = 8

∴P (a prime no.) = $\frac{8}{20} = \frac{2}{5}$

17. Three coins are tossed simultaneously 200 times with the following frequencies of different outcomes

Outcomes 3 heads 2 heads 1 head No head

Frequency 23 72 77 28

Compute the probability of 2 heads coming up

Ans. Total no. of tosses = 200

No. of outcomes of 2 heads = 72

P (2 heads) $= \frac{72}{200} = \frac{9}{25}$

18. A die is thrown once. Find the probability of getting (i) an odd number (ii) a number greater than one.

Ans. If a die is thrown once, total possible outcomes are $S = \{1, 2, 3, 4, 5, 6, \}$

$$i) E = \{1, 3, 5\}$$
$$n(E) = 3, \; n(S) = 6$$

$E =$ an odd no

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{3}{6} = \frac{1}{2}$$

(ii) a no. greater than one

19. Two coins are tossed 340 times and the outcomes are

(i) Two tail =115 (ii) one tail =100 (iii) no tail =125

Find the probability of occurrence of (i) one tail (ii) three tail

Ans. Total possible outcomes = 340

(i) Occurrence of one tail = 100

$$\therefore P(E) = \frac{100}{340} = \frac{5}{17}$$

(ii) Occurrence of three tails = 0

$$\therefore P(E) = \frac{0}{340} = 0$$

20. To know the option of the students about the subject mathematics a survey of 200 students was conducted. The obtained data is given below.

Opinion	No. of students
like	135

dislike	65

(i) like mathematicsFind the probability that a student chosen at random

(ii) does not like it

Ans. Total number of students are 200

(i) No. of students like mathematics = 135

$$P\left(E\right) = \frac{135}{200} = \frac{27}{40}$$

(ii) No. of students dislike mathematics = 65

$$P\left(\bar{E}\right) = \frac{65}{200} = \frac{13}{40}$$

21. Out of 17 boys and 13 girls of a class, 1 student is to be selected. Find the probability of selecting a girl

Ans. Total no. of students = 17+13=30

No. of girls = 13

P (a student selecting a girl) = $\frac{13}{30}$

22. A bag contains 5 white, 4 red and 3 black balls. A ball is drawn from the bag, find the probability that it is not black

Ans. No. of white balls = 5

No. of red balls = 4

No. of black balls = 3

Total no. of balls = 5+4+3 = 12

P (Black balls) = $\frac{3}{12} = \frac{1}{4}$

P (the ball is not black) = $1 - \frac{1}{4} = \frac{3}{4}$

23. A card is drawn from a 52 pack of cards. Find the probability that it is a queen

Ans. Total no. of cards =52

No. of queens = 4

P (getting a queen) = $\frac{4}{52} = \frac{1}{13}$

24. There are 500 tickets of a lottery out of which 10 are prize winning tickets. A person buys one ticket. Find the probability that he gets a prize winning ticket.

Ans. Total no. of lottery tickets = 500

No. of prize winning tickets = 10

P (Prize winning tickets) = $\frac{10}{500} = \frac{1}{50}$

3 Marks Questions

1. 1500 families with 2 children were selected randomly and the following data were recorded:

No. of girls in a family	No. of families
2	475
1	814
0	211

Compute the probability of a family, chosen at random, having:

(i) 2 girls (ii)1 girl (iii) No girl

Also check whether the sum of these probabilities is 1.

Ans No. of families having 2 girls = 475

$\therefore$ P (Family having 2 girls) = $\frac{475}{1500} = \frac{19}{60}$

(ii) No of families having 1 girl = 814

$\therefore$P(Family having 1 girl) = $\frac{814}{1500} = \frac{407}{750}$

(iii) No. of families having no girl = 211

$\therefore$ P (Family having no girl) = $\frac{211}{1500}$

- : Sum of all probabilities = $\frac{19}{60} + \frac{407}{750} + \frac{211}{1500}$

= $\frac{475+814+211}{1500} = \frac{1500}{1500}$ = 1

Yes, the sum of probabilities is 1.

2. An organization selected 2400 families at random and surveyed them to determine a relationship between income level and the number of vehicles in a family. The information gathered is listed in the table below:

Monthly income (in Rs.)	Vehicles per family			
	0	1	2	Above 2
Less than 7000	10	160	25	0
7000 – 10000	0	305	27	2
10000 – 13000	1	535	29	1
13000 – 16000	2	469	59	25
16000 or more	1	579	82	88

Suppose a family is chosen. Find the probability that the family chosen is:

1. earningRs. 10000 – 13000 per month and owning exactly 2 vehicles.
2. earningRs. 16000 or more per month and owning exactly 1 vehicle.
3. earning less than Rs. 7000 per month and does not own any vehicle.
4. earningRs. 13000 – 16000 per month and owning more than 2 vehicles.
5. not more than 1 vehicle.

Ans (i) P (earning Rs. 10000 – 13000 per month and owning exactly 2 vehicles) = $\frac{29}{2400}$

(ii) P (earning Rs. 16000 or more per month and owning exactly 1 vehicles) = $\frac{579}{2400}$

(iii) P (earning Rs. 7000 per month and does not own any vehicles) = $\frac{10}{2400} = \frac{1}{240}$

(iv) P (earning Rs. 13000 – 16000 per month and owning more than 2 vehicles) = $\frac{25}{2400} = \frac{1}{96}$

(v) P (owning not more than 1 vehicle) =
$\frac{2062}{2400} = \frac{1031}{1200}$

3. The marks obtained by 30 students is given in the following table:

Marks 70 58 60 52 65 75 68

No. of Students 3 5 4 7 6 2 3

Find the Probability that a student secures

(i) 60 marks (ii) 75 marks (iii) Less than 60 marks

Ans. Total no. of students = 30

No. of students securing 60 marks = 4

(i) $\therefore$P (Students securing 60 marks) $= \frac{4}{30} = \frac{2}{15}$

(ii) No. of students securing 75 marks = 2

$\therefore$ P (Students securing 75 marks) $= \frac{2}{30} = \frac{1}{15}$

(iii) No. of students securing less than 60 marks = 5+7 = 12

P (Students securing less than 60 marks) $= \frac{12}{30} = \frac{2}{5}$

4. A tyre manufacturing company kept a record of the distance covered shows the results of 1000 tyres

Distance(in km) Less then 4000 4000 to 9000 9001 to 14000 More then 14000

Frequency 20 210 325 445

If you buy a tyre of this company. What is the Probability that

(i) it will need to be replaced before it has covered 4000 km

(ii) it will last more than 9000 km

(iii) it will need to be replaced after it has covered somewhere between 4000 km and 14000 km

Ans. (i) No. of tyres which covered distance less than 4000 km = 20

Total no. of tyres = 1000

Required probability $P(E) = \frac{20}{1000} = \frac{1}{50}$

(ii) No. of tyres needed to replaced more then 9000 km = 325+445=770

Required Probability $= \frac{770}{1000} = \frac{77}{100} = 0.77$

(iii) No. of tyres needed to replaced between 4000 km, to 14,000km.

$$= 210 + 325 + 445 = 980$$

Required probability $= \frac{980}{1000} = 0.98$

5. The ages of 30 workers in a factory are as follows

Age (in yrs) 21-23 23-25 25-27 27-29 29-31 31-33 33-35

workers 3 4 5 6 5 4 3

Find the probability that the age of a works lies in the interval

(i) 27-29

(ii) 29-35

(iii) 21-27

Ans. I Part

The no. of workers lies in the interval 27-29 are = 6

Total no. of workers = 30

Required probability = $\frac{6}{30} = \frac{1}{5}$

II Part

No. of workers having age between 29 - 35 = 5+4+3 = 12

Total no. of workers = 30

Required Probability = $\frac{12}{30} = \frac{2}{5}$

III Part

No. of workers having age between 21 -27 = 3+4+5=12

Total no. of workers = 30

Required Probability = $\frac{12}{30} = \frac{2}{5}$

6. A die is thrown once. Find the probability of getting

(i) a prime number

(ii) a number less then 5

Ans. When a die is thrown, then outcomes are 1, 2, 3, 4, 5, 6

(i) Prime numbers are = 2, 3, 5

∴ Frequency of happening prime number is 3

∴ The probability of getting prime number $= \frac{3}{6} = \frac{1}{2}$

(ii) Numbers less than 5 are 1, 2, 3, 4

∴ Frequency of happening of a no. less than 5 is 4

∴ Probability of getting a number less than 5

$= \frac{4}{6} = \frac{2}{3}$

7. A die is thrown 450 times and outcomes are noted in the frequency distribution table given below.

Outcome 1 2 3 4 56

frequency 90 60 657080 85

Find the probability of the occurrence of the event.

(i) 4 (ii) a number < 3 (iii) 7

Ans. Total no. of times die thrown = 450

(i) No. of times the no. 4 comes up = 70

P (getting no. 4) $= \frac{70}{450} = \frac{7}{45}$

(ii) no. of times the die turns up 1 or 2 = 90+60 = 150

P (1 or 2) = $\frac{150}{450} = \frac{1}{3}$

(iii) No. of times the die turn up 7 = 0

P (7) = $\frac{0}{450} = 0$

8. From a well- shuffled pack of 52 cards, a card is drawn at random, find the probability that it is :

(i) A spade (ii) Black (iii) Ace of diamond

Ans. Total no. of cards = 52

(i) No. of spade = 13

P (Spade) = $\frac{13}{52} = \frac{1}{4}$

(ii) No. of black cards = 26

P (black cards) = $\frac{26}{52} = \frac{1}{2}$

(iii) No. of ace of diamond = 1

P (ace of diamond) = $\frac{1}{52}$

9. The central Board of secondary education has a waiting list of examinations of 150 Persons. Out of these, 60 are women and 90 are men. One examiner is to selected to replace an examiner who has not reported at the centre find the probability that the examiner selected is a :

(i) woman (ii) man

Ans. (i) No. of trials = 150

No. of women = 60

∴ P (The examiner selected is a woman) = $\frac{60}{150} = \frac{2}{5}$

(ii) Number of men = 90

$\therefore$ P (The examiner selected is a man) = $\frac{90}{150} = \frac{3}{5}$

P (woman) + P (man) = $\frac{2}{5} + \frac{3}{5} = 1$

10. Two coins are tossed 250 times and the outcomes are :

(i) No head =70 (ii) one head =85 (iii) Two heads =95,

Find the probability of the occurrence of each of these events.

Ans Total no. of times coin tossed = 250

(i) No. of times no head comes up = 70

P (No Head) = $\frac{70}{250} = \frac{7}{25}$

(ii) No. of times one head comes up = 85

P (one head) = $\frac{85}{250} = \frac{17}{50}$

(iii) No. of times two head comes up = 95

P (Two head) = $\frac{95}{250} = \frac{19}{50}$

11. Out of 100 balls in a bag 25 are green, 30 are yellow and 45 are white. Find the Probability that a ball drawn from the bag is (i) green (ii) yellow (iii) white

Ans Total number of balls are 100

(i) No. of green balls = 25

$P(G) = \frac{25}{100} = \frac{1}{4}$

(ii) No. of yellow balls = 30

$P(Y) = \frac{30}{100} = \frac{3}{10}$

(iii) No. of white balls = 45

$P(W) = \frac{45}{100} = \frac{9}{20}$

12. Eleven bags of wheat flour, each marked 5 kg actually contained the following weights of flour (in kg)

4.97, 5.05, 5.08, 5.03, 5.00, 5.06, 5.08, 4.98, 5.04, 5.07, 5.00

Find the probability that any of these bags chosen at random contains more than 5 kg of flour.

Ans. Total no. of bags =11

No. of bags contains more than 5 kg of flour = 7

$$P\left(E\right) = \frac{7}{11}$$

13. 1500 families with 2 children were selected randomly and the following data were recorded

No. of girls in a family 2 1 0

No. of families 475 814 211

Compute the probability of a family, chosen at random, having.

(i) 2 girls (ii) 1 girl (iii) No girl

Also check whether the sum of these probabilities is

Ans (i) Total no. of Families = 1500

No. of family having 2 girls = 475

$$P\left(E\right) = \frac{475}{1500} = \frac{95}{300} = \frac{19}{60}$$

(ii) No. of families having 1 girl = 814

$$P\left(E\right) = \frac{814}{1500} = \frac{407}{750}$$

(iii) No. of families having no girl = 211

$$P\left(E\right) = \frac{211}{1500}$$

14. Fifty seeds were selected at random from each of 5 bags of seeds and were kept under standardized condition favorable to germination. After 20 days, the number of seeds which had germinated in each collection were counted and recorded as follows.

Bag 1 2 3 4 5

No. of seeds germinated 40 48 42 39 41

What is the probability of germination of

More than 40 seeds in a bag? (ii) 49 seeds in a bag (iii) More than 35 seeds in a bag

Ans i) No. of bags in which more than 40 seeds germinated out of 50 seeds is 3

∴Required probability $P(E) = \frac{3}{5} = 0.6$

ii) No. of bags in which 49 seeds germinated = 0

Required probability $P(E) = \frac{0}{5} = 0$

iii) No. of bags in which more than 35 seeds germinated = 5

Required probability $P(E) = \frac{5}{5} = 1$

15. It is known that a box of 550 bulbs contain 22 defective bulbs. One bulb is taken out at random from the box. Find the probability of getting

(i) Defective bulbs (ii) Good bulbs

Ans. Total number of bulbs = 550

Number of defective bulbs = 22

∴No. of good bulbs = 550-22=528

(i) P (defective bulbs) = $\frac{22}{550} = 0.04$

(ii) P (good bulbs) = $\frac{528}{550} = 0.96$

16. Frequency distribution of marks obtained by 70 Students is given below:

Marks obtained 0-10 10-20 20-40 40-45 45-60 60-70 70-80

No. of students 4 8 20 10 12 6 10

Find the probability that the marks obtained by a student lies in the internal

(i) 0-40 (ii)0-80 (iii) 80-90

Ans Total number of students = 70

(i) no. of students getting marks 0-40

$= 4 + 8 + 20 = 32$

P (students getting marks 0-40)$= \frac{32}{70} = 0.457$

(ii) no. of students getting marks 0-80

$= 4 + 8 + 20 + 10 + 12 + 6 + 10 = 70$

P (students getting marks 0-80)$= \frac{70}{70} = 1$

(iii) no. of students getting marks 80-90 = 0

P (students getting marks 80-90)$= \frac{0}{70} = 0$

17. A box contains 150 balls of red, blue and white colours out of these 50 balls are red, 40 balls are blue and 60 balls are white. One ball is drawn from the bag. Find the probability that the ball drawn is

(i) Red (ii) blue (iii) white

Ans Total number of balls = 150

No. of red balls = 50

No. of blue balls = 40

No. of white balls = 60

(i) P (red ball) = $\dfrac{50}{150} = \dfrac{1}{3}$

(ii) P (blue ball) = $\dfrac{40}{150} = \dfrac{4}{15}$

(iii) P (white ball) = $\dfrac{60}{150} = \dfrac{2}{5}$

18. A die is thrown 500 times. The frequency of the outcomes of the event 1,2,3,4,5 and 6 are recorded in the following frequency distribution table

Outcome 1 2 3 4 5 6

Frequency 85 75 80 9010070

Find the probability of the occurrence of an (i) even number (ii) odd number.

Ans Total no. of out comes = 500

(i) Frequency of dice getting even number $75 + 90 + 70 + = 235$

P (even number) = $\dfrac{235}{500} = \dfrac{47}{100}$

(ii) P(odd number) = $1 - \dfrac{47}{100} = \dfrac{53}{100}$

4 Marks Questions

1. The weekly pocket expenses of students are given below:

POCKET EXPENSES (in Rs.)	45	40	59	71	58	47	65
NO. OF STUDENTS	7	4	10	6	3	8	1

Find the probability that the weekly pocket expenses of a student are

(a) (i) Rs 59 (ii) more than Rs 59 (iii) less than Rs 59

(b) Find the sum of probabilities computed in (i), (ii), and (iii)s

Ans. (a) No. of students = 39

∴ No. of trials = 39

(i) Number of students with weekly pocket expenses of Rs 59 = 10

∴P (the weekly pocket expenses of a student are Rs 59) $= \frac{10}{39}$

(ii) No. of students with weekly pocket expenses of more than Rs 59 = 6+1=7

∴P (the weekly pocket expenses of a student are more than Rs 59) $= \frac{7}{39}$

(iii) Number of students with weekly pocket expenses of less than Rs 59

=7+4+3+8=22

∴P (the weekly pocket expenses of a student are less than Rs 59) $= \frac{22}{39}$

(b) Sum of probabilities in (i),(ii), and (iii)

$= \frac{10}{39} + \frac{7}{39} + \frac{22}{39} = \frac{39}{39} = 1$

2. Cards marked 2 to 101 are placed in a box and mixed thoroughly. One card is drawn from the box. Find the probability that number on the card is (i) an even number (ii) a

number less than 14 (iii) a number which is a perfect square (iv) a prime number less than 20. (v) an odd number.

Ans. Total number of cards = 100

even numbers are = 50

P (even number) = $\frac{50}{100} = \frac{1}{2}$

(ii) no. less than 14 are
$= (2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13)$
$= 12$

P (no. less than 14) = $\frac{12}{100} = 0.12$

(iii) Number which is a Perfect square
$= \{1, 4, 9, 16, 25, 36, 49, 64, 81, 100\}$
$= 10$

P (number which is a perfect square) $= \frac{10}{100} = \frac{1}{10}$

(iv) Prime no. less than 20 are
$= \{2, 3, 5, 7, 11, 13, 17, 19\}$
$= 8$

P (Prime no. less than 20) $= \frac{8}{100} = \frac{2}{25}$

(v) P (odd number) $= 1 - P$(an even no.)